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Comparison in Women Versus Men of Composition of Atherosclerotic Plaques in Native Coronary Arteries and in Saphenous Veins Used as Aortocoronary Conduits

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Objectives. This study quantifies and compares the components of atherosclerotic plaques in native coronary arteries and in saphenous vein grafts used for aortocoronary bypass surgery in women versus those in men.

Background. Plaque composition has been described in various manifestations of fatal coronary artery disease and after the bypass operation, but no reports have investigated this composition according to gender.

Methods. A total of 979 5-mm segments of native coronary arteries and 842 5-mm segments of saphenous vein grafts were examined by computerized planimetric technique in 11 women and 11 men who were matched for survival time after the bypass operation.

Results. Comparison of the plaque components revealed that atherosclerotic plaques in women, compared with those in men, contained significantly more cellular fibrous tissue, both in native coronary arteries (mean 38% vs. 4%, $p < 0.001$) and in saphenous vein grafts (mean 70% vs. 36%, $p < 0.05$). In contrast, the proportion of dense fibrous tissue was significantly less in the atherosclerotic plaques of women than in those of men, both in native coronary arteries (mean 50% vs. 85%, $p < 0.001$) and in saphenous vein grafts (mean 25% vs. 57%, $p < 0.05$).

Conclusions. Cellular fibrous tissue is often found at an early stage of plaque development, whereas dense fibrous tissue is a major component in later stages. Thus, the plaque composition of the native coronary arteries and saphenous venous conduits differed in men and women, with the plaques of the women appearing younger than those of the men.

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Although several studies have described the composition of atherosclerotic plaques in patients with various manifestations of coronary artery disease (1–5) and in patients who underwent aortocoronary bypass surgery (6–12), none have compared the composition of atherosclerotic plaques in women and men.

Accordingly, we examined in detail plaque composition in 11 women and 11 men, matched for survival time after an aortocoronary bypass operation performed >1 year earlier. Both the native coronary arteries and the saphenous veins used as aortocoronary conduits were studied.

Methods

Study patients. We limited our study to women and men in whom the heart, the native coronary arteries and the saphenous vein bypass grafts were available for examination and whose saphenous veins had been in the aortocoronary position for >1 year. Because a previous study (13) had shown that the duration of saphenous vein placement in the aortocoronary position was the most important determinant of plaque composition, we selected pairs of women and men with a similar time interval from bypass operation to death. Of 19 women and 53 men who met the aforementioned criteria, 11 pairs were matched according to survival time after an aortocoronary bypass operation. In all three tables in this study, patients are listed by survival time (from the shortest to the longest); Patient 1 of the women matches to Patient 1 of the men, and so forth. The interval from the bypass operation to death ranged from 22 to 120 months (mean 45) in the 11 women and from 19 to 120 months (mean 46) in the 11 men. The age of the women ranged from 44 to 78 years (mean 63), that of the men ranged from 47 to 76 years (mean 62). The women had a total of 35 saphenous vein conduits, the men had 25; the number of grafts per patient ranged from one to four (mean 3.2 in women and 2.3 in men). A saphenous vein having one aortic anastomosis and one or more coronary artery anastomoses was considered a single conduit. Clinical features of the 22 patients are shown in Table 1. Death had a *cardiac cause* in seven women (64%) and six men (55%): sudden cardiac arrest without myocardial necrosis in four women and three men, chronic congestive heart failure in three women and two men

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Table 1. Clinical and Necropsy Findings in 11 Women and 11 Men Surviving 1 Year After Coronary Artery Bypass Grafting

Case No.	Age at Death (yr)	Interval From CABG to Death (mo)	Htn	DM	After CABG AP	After CABG AMI	After CABG CHF	Mode of Death	Heart Weight (g)	Dilated LV	LV Necrosis	LV Fibrosis
A. Women												
1	65	22	+	+	0	+	0	Sudden	565	+	+	+
2	64	24	+	+	+	0	+	CHF	490	+	0	+
3	70	24	0	0	0	0	+	CHF	500	+	0	+
4	44	26	+	0	0	0	+	Sudden	600	+	0	+
5	68	30	+	+	+	0	+	Sudden	550	+	0	0
6	61	31	+	+	0	0	0	GI bleeding	440	+	0	+
7	78	37	+	0	0	0	0	Cancer	355	0	0	+
8	44	43	0	+	+	+	+	CHF	498	+	0	+
9	68	70	+	+	0	0	+	Sudden	550	+	0	+
10	59	72	0	0	0	0	0	Cancer	480	0	0	0
11	74	120	0	0	0	0	0	Trauma	466	0	0	0
Total* or mean	63	45	7*	6*	3*	2*	6*		499	8*	1*	8*
B. Men												
1	54	19	+	+	0	0	+	CHF	510	+	0	+
2	60	24	0	0	0	0	+	CHF	540	+	0	+
3	66	26	0	0	0	0	0	Sudden	460	0	0	+
4	62	27	+	0	0	0	0	Cancer	450	0	0	0
5	47	32	0	+	+	0	0	AMI	390	0	+	0
6	69	34	0	0	+	+	0	Sudden	550	+	0	+
7	49	39	0	0	0	0	0	Sudden	370	0	0	0
8	76	48	0	0	0	0	0	Cancer	395	0	0	+
9	73	60	+	0	0	0	0	COPD	540	0	0	+
10	69	82	0	0	0	0	0	Cancer	440	0	0	0
11	54	120	+	0	+	0	0	Carotid operation	560	0	0	+
Total* or mean	62	46	4*	2*	3*	1*	2*		473	3*	1*	7*

AMI = acute myocardial infarction; AP = angina pectoris; CABG = coronary artery bypass grafting; CHF = chronic congestive heart failure; COPD = chronic obstructive pulmonary disease; DM = diabetes mellitus; GI = gastrointestinal; Htn = systemic hypertension by history; LV = left ventricle (ventricular); + = present; 0 = absent.

and acute myocardial infarction in one man. Death was attributed to a *non-cardiac cause* in four women (36%) and five men (45%): cancer in two women and three men and miscellaneous conditions in the other patients (gastrointestinal bleeding, trauma, chronic obstructive pulmonary disease and carotid operation).

Method of examination of native coronary arteries and saphenous vein grafts. The native coronary arteries and saphenous vein grafts were studied in a similar fashion. The hearts were fixed in formalin. The four major epicardial coronary arteries (left main, left anterior descending, left circumflex and right) and the saphenous vein bypass grafts were removed from the heart intact and cut transversely at 5-mm intervals. In one woman and one man the left main coronary artery was not available for examination. Except for the segments adjacent to anastomoses, the entire lengths of the native coronary arteries and vein conduits were available for examination. The segments were labeled sequentially from their origin. Each segment was processed in alcohol and xylene, embedded in paraffin, cut into sections 6 μm thick and stained by the Movat method (14). Of 1,918 sections initially examined, 97 were excluded because of sectioning artifacts. Thus, a total of 979 5-mm segments of native coronary arteries (mean 45/patient) and 842 segments of saphenous vein grafts (mean 38/patient) were studied. Plaque composition was assessed by planimetry: Movat-stained sections were placed on the stage of a projection light microscope, enlarging the image approximately 150 times. A tracing of the artery was made using a GTCO micro DigiPad. The area was calculated using Macmeasure (15), a morphometric software package used in conjunction with a Macintosh computer. The following areas were outlined: potential lumen (total area enclosed by the internal elastic membrane); residual lumen (potential lumen minus area of atherosclerotic plaque), and the components of the plaque separated into dense fibrous tissue, cellular fibrous tissue, calcific deposits, pultaceous debris (extracellular lipid), foam cells (intracellular lipid) with and without lymphocytes and inflammatory infiltrates without significant numbers of foam cells. Analysis of components was performed in all 5-mm segments in each of the four major epicardial coronary arteries and all saphenous venous bypass grafts in every patient.

Dense fibrous tissue consisted of nearly acellular, rela-

tively homogeneous fibrous tissue staining yellow or yellow-brown by the Movat stain. *Cellular fibrous tissue* contained numerous spindle cells resembling myofibroblasts, smooth muscle cells or fibroblasts admixed with fibrous tissue and often elastic fibers. *Calcific deposits* were detected by blackish, brownish or purple collections of granular staining areas in Movat-stained sections. *Pultaceous debris* (presumably rich in extracellular lipid) consisted of collections of amorphous pale-staining material with abundant cholesterol clefts. *Foam cell aggregates* were composed of plump, rounded, finely vacuolated cells. *Foam cells and lymphocytes* were areas containing round cells with finely granular or vacuolated cytoplasm admixed with lymphocytes. *Inflammatory infiltrates without foams cells* were isolated aggregates of lymphocytes and other inflammatory cells that were almost always seen surrounding small vascular channels. The defined areas were recognized using the projection microscope and were confirmed by standard light microscopy.

After outlining and measuring the area of the plaque components, the area of each plaque component was converted to a percentage of the total plaque area. Other findings, such as hemorrhage into plaques and multilumen channels, were recorded but were not part of the analysis because they were considered to be a result of complications such as rupture of a plaque or total occlusion of the lumen by plaque.

Lumen narrowing, measured as a decrease in the cross-sectional area enclosed by the border of the internal elastic membrane, was graded by visual inspection of the histologic sections at a magnification of ×40. The amount of narrowing of each 5-mm segment was categorized into five groups: 0% to 25%, 26% to 50%, 51% to 75%, 76% to 95% and 96% to 100%.

Statistical analysis. For each patient a mean percentage of segments narrowed in each category of cross-sectional area narrowing was determined. Based on the mean for each patient, the total mean ± SD for the women and men was calculated for each category of narrowing.

The area of each plaque component was converted to a percentage of the total plaque area. For each patient the average plaque composition in the native coronary arteries was determined by calculating the mean of all 5-mm segments of the four coronary arteries of each individual patient. On the basis of the mean value for each patient, the

Table 2. Degree of Narrowing and Composition of Atherosclerotic Plaques in the Native Coronary Arteries in Women Compared With Men

Case No.	5-mm Segments (no.)	5-mm Segments With CSA Plaque Narrowing (no. [%])					Plaque Composition*						
		0% to 25%	26% to 50%	51% to 75%	76% to 95%	96% to 100%	DFT (%)	CFT (%)	CD (%)	PD (%)	FC (%)	FC+L (%)	ICWFC (%)
A. Women													
1	64	34 [53]	15 [23]	10 [16]	4 [6]	1 [2]	34.1	58.7	0.8	5.9	0.1	0.2	0.1
2	50	4 [8]	4 [8]	11 [22]	22 [44]	9 [18]	61.9	14.5	21.1	0.7	0.1	0.4	0.2
3	42	15 [36]	4 [10]	10 [24]	13 [31]	0 [0]	52.9	38.6	7.9	0.5	0.1	0.0	0.1
4	46	7 [15]	4 [9]	7 [15]	20 [43]	8 [17]	49.4	39.4	6.1	2.4	1.8	0.1	0.2
5	35	1 [3]	3 [9]	11 [31]	16 [46]	4 [11]	84.5	8.9	3.2	3.0	0.1	0.0	0.0
6	49	4 [8]	5 [10]	29 [59]	11 [22]	0 [0]	26.9	63.9	6.9	1.1	0.6	0.5	0.1
7	51	12 [24]	15 [29]	15 [29]	7 [14]	2 [4]	30.2	61.4	5.0	2.9	0.2	0.3	0.0
8	48	3 [6]	6 [13]	11 [23]	16 [32]	12 [25]	51.6	26.8	19.8	1.4	0.0	0.1	0.4
9	36	4 [11]	2 [6]	11 [31]	16 [44]	3 [8]	69.6	21.3	0.0	7.9	0.1	0.0	1.1
10	40	8 [20]	7 [18]	12 [30]	10 [25]	3 [8]	20.7	62.0	17.2	0.1	0.0	0.0	0.0
11	54	12 [22]	10 [19]	11 [20]	10 [19]	11 [20]	63.3	24.4	7.6	3.9	0.0	0.0	0.0
Mean	47	9 [19]	7 [15]	13 [28]	13 [28]	5 [10]	49.6	38.2	8.7	2.7	0.3	0.1	0.2
B. Men													
1	37	0 [0]	19 [51]	10 [27]	2 [5]	6 [16]	81.3	4.3	2.2	10.7	1.2	0.2	0.3
2	45	13 [29]	8 [18]	13 [29]	11 [24]	0 [0]	93.5	0.0	3.5	1.7	0.2	0.2	0.0
3	40	10 [25]	7 [18]	11 [28]	11 [28]	1 [3]	93.7	4.5	1.8	0.0	0.0	0.0	0.1
4	39	9 [23]	7 [18]	5 [13]	12 [31]	6 [15]	86.5	0.6	11.0	1.7	0.0	0.2	0.0
5	30	16 [53]	8 [27]	0 [0]	5 [17]	1 [3]	96.6	1.4	1.4	0.0	0.5	0.0	0.1
6	49	5 [10]	5 [10]	2 [4]	24 [49]	13 [27]	69.5	15.8	13.4	0.2	0.0	0.0	0.0
7	47	2 [4]	5 [11]	12 [26]	17 [36]	11 [23]	89.1	0.5	4.9	4.6	0.2	0.2	0.5
8	48	0 [0]	1 [2]	6 [13]	34 [71]	7 [15]	78.1	6.5	12.0	3.1	0.0	0.0	0.0
9	29	2 [7]	5 [17]	9 [31]	8 [28]	5 [17]	61.6	12.7	18.1	5.5	0.0	0.0	0.0
10	56	0 [0]	5 [9]	5 [9]	20 [36]	26 [46]	92.9	2.0	4.1	0.5	0.1	0.0	0.0
11	44	6 [14]	1 [2]	5 [11]	20 [45]	12 [27]	87.3	0.0	4.0	8.0	0.1	0.0	0.6
Mean	42	6 [14]	6 [14]	7 [17]	15 [36]	8 [19]	84.5	4.4	6.9	3.3	0.2	0.1	0.1

*Hemorrhage into plaques or multilumen channels are not listed; therefore, numbers do not add up to 100% in each patient. CD = calcific deposits; CFT = cellular fibrous tissue; CSA = cross-sectional area; DFT = dense fibrous tissue; FC = foam cells; FC+L = foam cells plus lymphocytes; ICWFC = inflammatory cells without foam cells; PD = pultaceous debris.

Table 3. Degree of Narrowing and Composition of Atherosclerotic Plaques in the Saphenous Vein Grafts in Women Compared With Men

Case No.	5-mm Segments (no.)	5-mm Segments With CSA Plaque Narrowing (no. [%])					Plaque Composition*						
		0% to 25%	26% to 50%	51% to 75%	76% to 95%	96% to 100%	DFT (%)	CFT (%)	CD (%)	PD (%)	FC (%)	FC+L (%)	ICWFC (%)
A. Women													
1	15	0 [0]	0 [0]	0 [0]	1 [7]	14 [93]	1.1	87.0	0.0	0.0	0.0	0.0	0.0
2	58	24 [41]	31 [53]	3 [5]	0 [0]	0 [0]	2.7	93.0	0.0	0.3	0.0	0.0	0.0
3	54	8 [15]	37 [69]	9 [17]	0 [0]	0 [0]	0.9	99.0	0.1	0.0	0.0	0.0	0.0
4	33	1 [3]	7 [21]	7 [21]	4 [12]	14 [42]	37.6	59.2	0.0	0.0	0.0	0.0	0.0
5	34	6 [18]	28 [82]	0 [0]	0 [0]	0 [0]	0.0	99.8	0.0	0.0	0.2	0.0	0.0
6	46	0 [0]	0 [0]	0 [0]	19 [41]	27 [59]	3.5	96.2	0.2	0.0	0.0	0.0	0.0
7	31	5 [16]	13 [42]	11 [35]	2 [6]	0 [0]	10.0	86.7	0.0	0.3	0.1	0.1	0.0
8	41	0 [0]	7 [17]	17 [41]	15 [37]	2 [5]	56.6	31.2	0.0	5.6	0.6	0.1	0.3
9	25	1 [4]	9 [36]	2 [8]	7 [28]	6 [24]	28.7	49.9	0.0	19.4	0.7	0.2	0.1
10	26	6 [23]	20 [77]	0 [0]	0 [0]	0 [0]	42.8	56.7	0.3	0.0	0.2	0.0	0.0
11	51	25 [49]	24 [47]	2 [4]	0 [0]	0 [0]	89.7	9.1	0.0	0.9	0.1	0.04	0.1
Mean	38	7 [18]	16 [42]	5 [13]	4 [11]	6 [16]	24.9	70.0	0.1	2.4	0.2	0.04	0.04
B. Men													
1	42	8 [19]	15 [36]	10 [24]	9 [21]	0 [0]	1.3	98.5	0.0	0.0	0.1	0.0	0.0
2	48	0 [0]	39 [81]	1 [2]	2 [4]	6 [13]	30.8	67.8	0.0	0.0	0.0	0.0	0.0
3	51	27 [53]	23 [45]	1 [2]	0 [0]	0 [0]	21.1	78.0	0.0	0.0	0.9	0.0	0.0
4	30	13 [43]	16 [53]	1 [3]	0 [0]	0 [0]	94.9	3.5	0.0	0.8	0.5	0.3	0.0
5	9	2 [22]	4 [44]	2 [22]	1 [11]	0 [0]	55.4	0.0	0.0	13.5	10.1	0.0	0.0
6	45	8 [18]	8 [18]	7 [16]	14 [31]	8 [18]	81.7	6.3	1.3	8.5	0.8	1.2	0.2
7	27	0 [0]	4 [15]	8 [30]	15 [56]	0 [0]	79.6	2.4	0.3	9.3	1.8	1.0	0.3
8	62	36 [58]	23 [37]	3 [5]	0 [0]	0 [0]	0.0	100.0	0.0	0.0	0.0	0.0	0.0
9	38	29 [76]	9 [24]	0 [0]	0 [0]	0 [0]	69.0	30.9	0.1	0.1	0.04	0.0	0.0
10	55	3 [5]	22 [40]	22 [40]	8 [15]	0 [0]	96.9	3.1	0.0	0.0	0.0	0.0	0.0
11	21	13 [62]	0 [0]	0 [0]	1 [5]	7 [33]	98.8	0.0	0.7	0.4	0.0	0.0	0.01
Mean	39	13 [33]	15 [38]	5 [13]	5 [13]	2 [5]	57.2	35.5	0.2	3.0	1.3	0.2	0.04

*Hemorrhage into plaques or multilumen channels are not listed; therefore, numbers do not add up to 100% in each patient. Abbreviations as in Table 2.

total mean value ± SD for the women and men was calculated for the native coronary arteries. In the same fashion, the total plaque composition of the saphenous vein grafts was determined.

For statistical evaluation, the mean percentages for each patient were used. The unit of comparison was the pairs of women and men matched by survival time after bypass operation. A paired *t* test was performed with a probability of < 0.05 (two-tailed) considered to be significant.

Results

Cross-sectional area narrowing. The results are summarized in Tables 2 and 3. In all 22 patients, one or more epicardial coronary arteries were narrowed significantly (>75% in cross-sectional area) by atherosclerotic plaque; an average of 38 ± 19% of coronary artery segments in the women and 55 ± 25% of segments in the men were narrowed to this degree. Six of the 11 women and 7 of the 11 men had one or more saphenous vein conduits narrowed by atherosclerotic plaque >75% in cross-sectional area; an average of 27 ± 40% of saphenous vein segments in the women and 18 ± 20% in the men were narrowed to this degree. Statistical comparison based on the pairs of women and men matched according to time interval from bypass operation to death did not reveal any difference between women and men with respect to narrowing in cross-sectional area in the native coronary arteries and in the saphenous vein grafts.

Plaque composition. The results are summarized in Tables 2 and 3 and Figures 1 and 2.

Fibrous tissue. The mean percentage of fibrous tissue in all plaques of the native coronary arteries was 88 ± 6% in women and 89 ± 7% in men; in the saphenous vein grafts it was 95 ± 7% and 93 ± 14%, respectively (paired *t* test: p = NS).

Analysis of the subtypes of fibrous tissue revealed that the mean percentage of *cellular* fibrous tissue in the plaques of the native coronary arteries was 38 ± 21% in women and 4 ± 5% in men ($p < 0.001$); in the plaques of the saphenous vein grafts it was 70 ± 31% and 36 ± 42%, respectively ($p < 0.05$). The mean percentage of *dense* fibrous tissue in the plaques of the native coronary arteries was 50 ± 20% in women and 85 ± 11% in men ($p < 0.001$); in the plaques of the saphenous vein grafts it was 25 ± 29% and 57 ± 38%, respectively ($p < 0.05$).

Calcific deposits. Calcific deposits were present in the plaques of the native coronary arteries in all patients except one woman. The mean percentage was 9 ± 7% in women and

JACC Vol. 21, No. 6
May 1993:1312–8

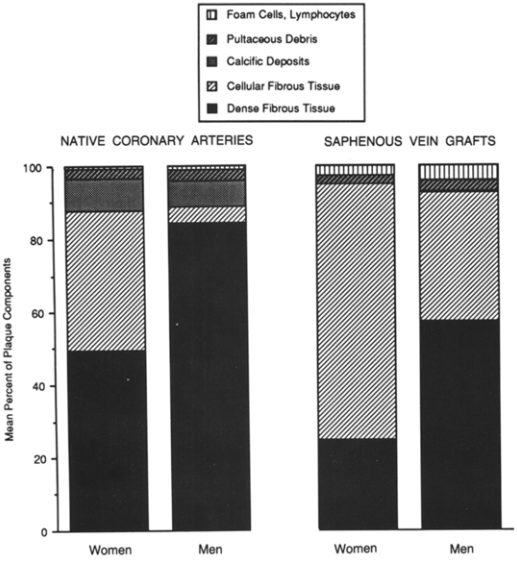


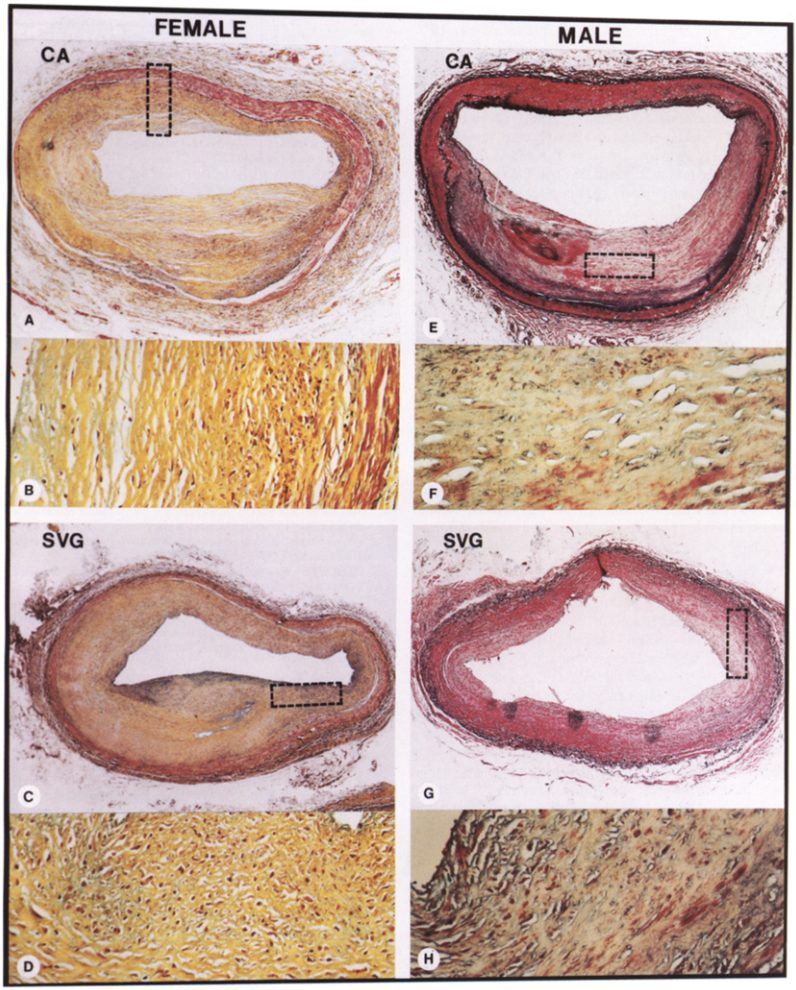
Figure 1. Graph comparing the mean composition of the plaques in the native coronary arteries and saphenous vein grafts of women and men. The plaques in women had a higher percentage of cellular fibrous tissue than did those in men. This difference was observed in the saphenous vein grafts and was even more pronounced in the native coronary arteries. In both men and women, calcific deposits were found mainly in native coronary arteries.

7 ± 6% in men. In the saphenous veins, calcific deposits were present in the plaques of three women and four men. The mean percentage was <1% in both groups. Statistically, the percentage of calcific deposits in the plaques did not differ between women and men in either the native coronary arteries or the vein grafts (p = NS).

Pultaceous debris (extracellular lipid). In the native coronary arteries, pultaceous debris was present in the plaques in 20 of the 22 patients. The mean percentage of pultaceous debris in all plaques of the coronary arteries was 2.7 ± 2.4% in women and 3.3 ± 3.6% in men (p = NS). In the saphenous vein grafts, pultaceous debris was found in the plaques in 4 of the 11 women and 6 of the 11 men. The mean percentage of pultaceous debris in all plaques of the saphenous vein grafts was 2.4 ± 5.9% in women and 3.0 ± 5.0% in men (p = NS).

Foam cells (intracellular lipid), foam cells with lymphocytes and inflammatory infiltrates without foam cells. The mean percentage of foam cells in all plaques of the native coronary arteries was 0.3 ± 0.5% in women and 0.2 ± 0.3% in men, and in the saphenous vein grafts it was 0.2 ± 0.2% in women and 1.3 ± 3.0% in men. Usually these cells were located on or near the borders of the lumen. The mean percentage of foam cells with lymphocytes and pure inflammatory cells was <1% in all plaques of both the native coronary arteries and the saphenous vein grafts in women as well as in men. Statistically, the percentage of foam cells, foam cells with lymphocytes, and inflammatory infiltrates without foam cells in the plaques did not differ between women and men in the native coronary arteries or the saphenous vein grafts (p = NS for all comparisons).

Figure 2 (opposite page). Photomicrographs of sections of native coronary arteries and saphenous vein grafts. **Left panels (A to D),** From a woman who survived 26 months after a coronary bypass operation (Case 4, Table 1A). **Right panels (E to H),** From a man who survived 27 months after a coronary bypass operation (Case 4, Table 1B). **A,** Section of a native coronary artery from a woman (Case 4). **B,** Higher magnification of the section in A. The plaque consists of 68% dense and 32% cellular fibrous tissue. **C and D,** The saphenous vein graft in this patient consists mostly of cellular fibrous tissue (90%). **E, F,** Example of a native coronary artery of a man (Case 4, Table 1B), revealing as main plaque component dense fibrous tissue (95%). A small area of calcific deposit is also present. **G, H,** In the plaque of the saphenous vein graft in this patient, dense fibrous tissue (89%) is the predominant component, whereas only a small amount (11%) of cellular fibrous tissue is present. CA = native coronary artery; SVG = saphenous vein graft; B, D, F, H are each higher magnifications of the area indicated by the rectangle in the section above. Movat stains: A ×34; C ×16; E ×34; G ×22; B, D, F, H ×200, all reduced by 22%.


FEMALE
MALE
CA
CA
A
E
B
F
SVG
SVG
C
G
D
H

Discussion

Although several studies have compared clinical features of myocardial ischemia and results after coronary angioplasty and after bypass surgery in women versus men (16–23), no study has compared the composition of atherosclerotic plaques in the coronary arteries or in other vascular systems in those two groups. The present study compared plaque composition according to gender in both native epicardial coronary arteries and in saphenous veins used as aortocoronary conduits. The 11 women and 11 men studied were matched for the length of time that the saphenous vein aortocoronary conduits had been in place. The native coronary arteries and the saphenous vein grafts of each patient were studied by dividing their entire lengths into 5-mm segments, which then were examined histologically. In all, nearly 2,000 sections were examined by a computerized morphometric technique.

Comparison of all categories of degree of lumen narrowing of the native coronary arteries and the saphenous vein grafts revealed no difference between findings in women versus those in men.

In contrast, analysis of plaque composition disclosed that the plaques in both the native coronary arteries and saphenous vein grafts differed in women and men: in the native coronary arteries, the mean percentage of dense, acellular fibrous tissue in the plaques was much lower in women than in men (mean 50% vs. 85%), and the mean percentage of cellular fibrous tissue in the plaques was much higher in women than in men (mean 38% vs. 4%). Similar findings were present in the saphenous veins used as aortocoronary conduits: dense, acellular fibrous tissue in the plaques of the saphenous vein grafts comprised a significantly smaller percentage in women than in men (mean 25% vs. 57%) and cellular fibrous tissue constituted a higher percentage in women than in men (mean 70% vs. 36%).

It was established previously (2,4,5,13) that cellular fibrous tissue, which was present in a higher amount in the plaques of the 11 women studied, is often found at an early stage of plaque development, whereas dense fibrous tissue, the dominant component in the plaques of the 11 men studied, is seen in later stages. These differences in plaque composition, that is, the younger appearance of plaques in the native coronary arteries and saphenous venous conduit in women and the older appearance in men, might be due to differences in duration or speed of the atherosclerotic process or to different mechanisms or influences in women and men, which will require further investigation.

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